NIST Photometry Short Course

August 29 — September 1, 2000

- Announcement -

National Institute of Standards and Technology

As part of the Commerce Department's Technology Administration, the National Institute of Standards and Technology (NIST) works to strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements, and standards. NIST carries out its mission through a portfolio of four major programs:

• Measurement and Standards Laboratories that provide technical leadership for vital components of the nation's technology infrastructure needed by U.S. industry to continually improve its products and services;

• the Advanced Technology Program, which accelerates the development of innovative technologies for broad national benefit through R&D partnerships with the private sector;

• a grassroots Manufacturing Extension Partnership with a nationwide network of local centers offering technical and business assistance to smaller manufacturers; and

• a highly visible quality outreach program associated with the Malcolm Baldrige National Quality Award that recognizes continuous improvements in quality management by U.S. manufacturers, service companies, educational organizations, and health care providers.

In fiscal year 2000, NIST is operating on a budget of about $800 million with nearly 3,300 staff members at its sites in Gaithersburg, Md., and Boulder, Colo. News and general information about NIST programs and services are available on the World Wide Web at http://www.nist.gov, or call General Inquiries at (301) 975-NIST (975-6478) or e-mail: inquiries@nist.gov.

Registration Contact

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Technical Information

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Course Description

The need for education and training for photometry engineers in industry has been stressed recently by the Council for Optical Radiation Measurements (CORM), Lamp Testing Engineer's Conference (LTEC), and other metrology groups in industry. In response to this need, the Short Course on Photometry has been established by NIST. The course was successfully offered in 1998 and 1999, and due to favorable response and continuing demand, the third one is planned for 2000.

The course, planned for three and half days with a limit of 30 participants*, is aimed mainly at customers of NIST photometric calibrations, and more widely, engineers and technicians engaged in photometric work in industry. The course will cover fundamentals in photometry and colorimetry and practical aspects of measurements of luminous flux, luminous intensity, illuminance, luminance, color temperature, and chromaticity of light sources. The course will consist of 10 lectures given mainly by NIST scientists and 3 hands-on laboratory sessions at the NIST photometry laboratory using the 4 m bench, the 2.5 m integrating sphere, and the color temperature measurement facility. Course participants, divided into three groups, will perform actual measurements of total luminous flux, luminous intensity and illuminance, and color temperature. Participants will gain experiences in the calibration of lamps, photometers, and colorimeters. *This course does not cover radiometry in general*, for which another NIST course is being planned.

* Registration for the laboratory sessions is limited to 18 persons.

WHO SHOULD ATTEND

This course is intended for photometry engineers and technicians in industries such as lighting, photography, and avionics; calibration and testing laboratories; instrument manufacturers; and others. Participants must have some basic knowledge and experience in photometric or radiometric measurements as well as calculus. The course is suited for those who want to learn photometry systematically in depth, in theory, and in experimental practice.

INSTRUCTORS

The instructors from the NIST Optical Technology Division are Dr. Yoshi Ohno, Dr. Steve Brown, Dr. Cameron Miller, Ms. Sally Bruce, and Mr. Yuqin Zong. Dr. Georg Sauter, a distinguished invited scientist from Physikalisch-Technische Bundesanstalt (PTB), Germany, will also join us to give lectures. Yoshi Ohno is a physicist and is the leader of the photometry project at NIST. He authored *NIST SP250-37 Photometric Calibrations* and two chapters in the *OSA Handbook of Applied Photometry*. Steve Brown is a physicist and is responsible for colorimetry of displays as well as absolute detector metrology. Cameron Miller is a research staff and is responsible for photometric calibrations. Sally Bruce is a physical scientist working in the area of detector metrology and also serves as the division's quality manager. Yuqin Zong is a contractor from Berkeley Research Associates, Springfield, VA, and is working full time for research and development in NIST photometry.

LOCATION

The course will be held at the National Institute of Standards and Technology, Administration Building (101), Lecture Room C, Gaithersburg, Maryland. Gaithersburg is located approximately 40 km northwest of Washington, DC.

TRANSPORTATION

Super Shuttle, **1-800-258-3826**, offers commercial van service from Baltimore-Washington International, Dulles International, and Ronald Reagan Washington National airports to the Gaithersburg area. Call for reservations.

The Washington Metro system has subway service to Gaithersburg and can be boarded at Ronald Reagan Washington National Airport. Take the Yellow Line train marked "Mount Vernon Square" to Gallery Place and transfer to the Red Line train marked "Shady Grove" to the Shady Grove station in Gaithersburg. Service is every six to fifteen minutes, depending on the time of day. Travel time from Ronald Reagan Washington to Shady Grove is approximately 50 minutes. Taxis are available from the Shady Grove Metro station to area hotels.

A NIST shuttle van operates for official visitors and conference attendees from the Shady Grove Metro station to NIST. The van leaves the Shady Grove station on the quarter and three-quarter hour (e.g., 8:15, 8:45...4:45, 5:15) from the east side parking lot.

Driving Directions

To reach NIST:

Traveling north on I-270: take Exit 10, Rt. 117 West, Clopper Road. At the first light on Clopper Road, turn left onto the NIST grounds.

Traveling south on I-270: take Exit 11B, Rt. 124 West, Quince Orchard Road. At the second light turn left onto Clopper Road. At the next light, turn right onto the NIST grounds.

To reach the Administration Building, turn left after passing the guard office. Signs will direct you to visitor parking.

To reach the hotel:

From northbound I-270: take Exit 11, Rt. 124 East, Montgomery Village Avenue. At the second traffic light, veer right onto Rt. 355. Turn right at the first traffic light onto Perry Parkway. The hotel will be on your right.

From southbound I-270: use Exit 11A and follow the same directions**.**

REGISTRATION

The registration fees are **$1,090** per person for the complete 4-day course that includes lectures and laboratory sessions and **$560** per person for the 2-day session of lectures only. Both fees include course materials (including *OSA Handbook of Applied Photometry*), coffee breaks, lunches, and a dinner.

Pre-registration is required. Attendance for the 4-day course is limited to 18 attendees on a first-come, first-served basis. Attendance for the 2-day session is limited to 12 attendees on a first-come, first-served basis. Registrations will be accepted in the order they are received by NIST. Those who applied for the full registration and cannot be accepted will be offered a lecture-only registration until 30 registrations in total have been accepted.

The enclosed registration form and payment must be received by **Tuesday, August 15, 2000**. **There will be no on-site registration**. Cancellations and/or substitutions must be requested, in writing, by **August 15**, and no refunds will be made after this date. Registration can be done electronically at:

https://sales.nist.gov/conf/secure/CONF240/conf_register.htm

Accommodations

A block of rooms has been reserved at the Gaithersburg Hilton, **(301) 977-8900**. The special room rate is **$99,** plus 12% tax. To register for a room, please send the enclosed hotel reservation card directly to the hotel no later than **July 28, 2000**. After that date the rooms will be released for general sale at the prevailing rates of the hotel. Cancellations must be made 24 hours prior to the arrival date to receive a refund.

COURSE OUTLINE

Basic concepts in photometry
- History of photometry and definition of the candela
- Relationship of radiometry and photometry

Quantities, units, and geometrical calculations
- Definitions of photometric units and quantities
- Flux transfer

Luminous intensity and illuminance measurement
- Standard lamps and standard photometers
- Measurement procedures
- Calibration of illuminance meters

Luminous flux measurement
- Reference standards
- Basic integrating sphere theories
- Measurement procedures

Goniophotometry
- Principles and design of goniophotometers
- Applications of goniophotometers

Fundamentals of colorimetry
- CIE colorimetry system
- Colorimeters and spectroradiometers

Color temperature and colorimetry of light sources
- Terms and definitions
- Measurement procedures
- Colorimetry of light sources

Luminance measurement
- Reference standards
- Measurement procedures
- Calibration of luminance meters

Uncertainty evaluation
- Basic concepts and terminology
- Construction of an uncertainty budget

Quality System
- What is a quality system?
- ISO Guide 25

Laboratory Sessions

1. Luminous intensity and illuminance measurements
2. Total luminous flux measurements using an integrating sphere
3. Color temperature measurements

Preliminary Agenda

Tuesday, August 29

8 a.m.	Registration
9 a.m.	Lecture Session
5:15 p.m.	Adjourn
6:30 p.m.	Dinner

Wednesday, August 30

9 a.m	Lecture Session
2:45 p.m.	NIST Laboratory Tour
5:30 p.m.	Adjourn

Thursday, August 31

9 a.m.	Laboratory Session
5:15 p.m.	Adjourn

Friday, September 1

8:30 a.m	Laboratory Session
11:30 a.m.	Data Analysis and Discussion
12:30 p.m.	Adjourn

Hotel Reservation

Please complete form and return by July 28, 2000, to:

Gaithersburg Hilton Hotel
620 Perry Parkway
Gaithersburg, Md. 20877
or
Telephone: (301) 977-8900
or
Fax: (301) 869-8597

Register for workshop

Please complete form and return by August 15, 2000, to:

NIST
Office of the Comptroller
100 Bureau Dr., Stop 3732
Bldg. 101, Rm. A807
Gaithersburg, Md. 20899-3732
or
Fax to:
Teresa Vicente
(301) 948-2067

Registration Form

Photometry Short Course, August 29-September 1, 2000

last name
first name
title
organization
address
room or mail code
city, state, zip
country
telephone
facsimile
email
handicap services

REGISTRATION FEES:

❑ **$1090 for full 4 days**

❑ **$560 for 2 days/Lecture Only**

Form of Payment:

❑ Check enclosed, payable to:

NIST/Photometry Short Course

Checks from outside the U.S.A. should be written on a U.S.A. bank.

❑ MasterCard ❑ VISA ❑ Discover ❑ American Express

Card No.
Expiration Date
Authorized Signature
Purchase Order No. / Training Form

(Enclose a copy or provide one on-site at registration; faxed copy unacceptable.)

Requests for cancellation and refund must be received in writing by **August 15, 2000.**

Hotel Reservation

last name
first name
title
organization
address
room or mail code
city, state, zip
country
telephone
facsimile
email
handicap services

Rate: **$99,** single or double, plus 12% tax. All reservations must be received by **July 28**. All reservations must be guaranteed with a one-night deposit. Reservations must be canceled 24 hours prior to the arrival date for a refund.
Arrival Date:
Departure Date:
Form of Payment:

❑ Check enclosed, payable to:

Gaithersburg Hilton
Checks from outside the U.S.A. should be written on a U.S.A. bank.

Card Type
Card No.
Expiration Date
Authorized Signature